

Normative Influences on Adolescents' Self-Reported Pro-Environmental Behaviors: The Role of Parents and Friends

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Abstract

Pro-environmental behavioral patterns are influenced by relevant others' actions and expectations. Studies about the intergenerational transmission of environmentalism have demonstrated that parents play a major role in their children's pro-environmental actions. However, little is known about how other social agents may shape youth's environmentalism. This cross-sectional study concentrates on the role that parents and peers have in the regulation of 12- to 19-year-olds' pro-environmental behaviors. We also consider the common response bias effect by examining the associations between parents, peers, and adolescents' pro-environmentalism in two independent data sets. Data Set 1 ($N = 330$) includes adolescents' perceptions of relevant others' behaviors. Data Set 2 ($N = 152$) includes relevant others' self-reported pro-environmental behavior. Our results show that parents' and peers' descriptive and injunctive norms have a direct effect on adolescents' pro-environmental behavior and an indirect one, through personal norms. Adolescents seem to be accurate in the perception of their close ones' environmental actions.

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Norms have been successfully used in psychology to explain behaviors in different domains such as alcohol misuse (Perkins, 2002), physical activity and healthy eating (Ball, Jeffery, Abbott, McNaughton, & Crawford, 2010), safe driving (Perkins, Linkenbach, Lewis, & Neighbors, 2010), and cancer-related behavior (Smith-McLallen & Fishbein, 2008). Environmental psychologists have also concluded that norms are important for predicting actions in favor of the environment (Schultz & Kaiser, 2012; Stern, 2000; Thøgersen, 2006). Researchers usually distinguish between two types of norms: social and personal. Social norms represent the perceived social pressure to perform a behavior (Ajzen, 1988; Fishbein & Ajzen, 2010) or they refer to a person's beliefs about the common or accepted behavior within the group (Cialdini & Trost, 1998). In turn, personal norms have been defined as a feeling of moral obligation to behave in a certain way (Schwartz, 1977).

Pro-environmental behavior (EB) has long been considered a moral issue (Harland, Staats, & Wilke, 1999; Kaiser, Hübner, & Bogner, 2005; Matthies, Selge, & Klöckner, 2012; Thøgersen, 1996), and personal environmental norms predict people's pro-EBs (Schultz & Kaiser, 2012) such as recycling (Bratt, 1999), using energy-saving light bulbs (Harland et al., 1999), and the use of public transportation (Bamberg, Hunecke, & Blöbaum, 2007). The role that personal environmental norms have in the regulation of EB and the importance of the social context for the development of EB in children and youth has been recognized (Chawla & Derr, 2012). In spite of this, there has been little examination of how personal norms and behaviors in favor of the environment develop in interaction with other people (but see Casaló & Escario, 2016; Grønhøj & Thøgersen, 2009, 2012; Matthies et al., 2012). This seems especially important for children and teenagers who, compared with adults, are likely to be more receptive to social influences (Gardner & Steinberg, 2005; Park, 1977).

When considering the socialization of environmentalism for youngsters, researchers have focused on parents as key social agents (e.g., Casaló & Escario, 2016; Matthies et al., 2012), and the possible influence of other key persons has often been neglected. We present an exploratory study to extend current research on this topic in two ways. First, we consider both primary and secondary social agents as key persons affecting adolescents' personal norms and behaviors in relation to the environment. Specifically, parents and peers are considered. Second, previous researchers have shown concerns

about participants' misperceptions of norms (Borsari & Carey, 2003; Vesely & Klöckner, 2017; Wenzel, 2005), which can affect the research findings. For instance, a person might adjust the perception of norms to his or her own attitudes and behaviors due to the false consensus effect (i.e., people tend to think that others think and act as they do, Mullen & Hu, 1988) or to a need to appear consistent in his or her responses (Cialdini, Trost, & Newsom, 1995; Falk & Zimmermann, 2013). We examined the possibility of adolescents' misperceiving significant others' behaviors by including two independent databases in our study. The first one registers adolescents' perceptions of descriptive norms, operationalized as perceptions of significant others' behaviors (Database 1). The second one includes key socializers' self-reported behaviors as descriptive norms (Database 2). In the following sections, we review the evidence accumulated to date about the influence of relevant others in youngsters' personal environmental norms and EB, briefly describe the biased perception of norms, and set up the basis for our study.

Normative Influence in Youngsters' Personal Environmental Norms and EB

Although the study of the development and transmission of environmental norms in young populations has been scant, evidence exists that youngsters are receptive to other people's attitudes and behaviors toward the environment (Casaló & Escario, 2016; Grønhøj & Thøgersen, 2012; Matthies et al., 2012). Parents have traditionally been considered children's main socialization agents (Bronfenbrenner & Evans, 2000; Maccoby, 1992, 2007) and treated as such when evaluating the social context of youngsters' pro-environmental practices (Casaló & Escario, 2016; Grønhøj & Thøgersen, 2009, 2012; Matthies et al., 2012; Meeusen, 2014). For instance, Casaló and Escario (2016) found a positive link between parental environmental concern and that of their children in a sample of 15-year-old children from 16 European countries. Similarly, Grønhøj and Thøgersen (2009) concluded that there are parent-adolescent (16- to 18-year-olds) similarities in pro-environmental values, attitudes, and behaviors conducted in the family context. In a later study, Grønhøj and Thøgersen (2012) found that family norms explained as much behavioral variance as adolescents' own attitudes.

There are several possible mechanisms underlying the effect of social norms on behavior. One reason for the direct effect comes from the assumption that social norms have an impact on behavior because of the social pressure a person experiences to conduct that behavior (Ajzen & Fishbein, 1980; Bamberg et al., 2007; Fishbein & Ajzen, 2010). Another possible reason is that individuals observe and imitate the behavior of significant others as an

effective and adaptive way of learning new behaviors (Bamberg et al., 2007; Cialdini, Reno, & Kallgren, 1990; Kallgren, Reno, & Cialdini, 2000). In concordance with Bandura's (1986) social learning theory, people may model their behavior after that of significant others who are considered to have more expertise in the performance of such behavior.

Considering the indirect effect of social norms via personal norms, researchers agree that social norms may become internalized (Bratt, 1999; Schwartz & Howard, 1984; Thøgersen, 2006), leading to personal norms which, in turn, predict behavior (Bamberg et al., 2007; Fishbein & Ajzen, 2010). To the best of our knowledge, there is only one study with youngsters that focuses on personal environmental norms. Matthies et al. (2012) examined the role that parents have in their children's (8- to 10-year-olds) personal environmental norms and recycling and reuse behaviors. According to their results, personal and injunctive norms affect children's EB. These norms were, in turn, influenced by parents' own behaviors (considered as a measure of descriptive norms), sanctions, and children's awareness of the needs and consequences.

The studies above suggest that parents modestly influence their children's personal environmental norms (Matthies et al., 2012) and actions in favor of the environment (Grønhøj & Thøgersen, 2009, 2012). This modest relationship between parents' and children's pro-environmental practices opens the possibility of other social agents influencing youngsters' environmentalism.

One source of environmentalism socialization that has received little attention is friends. Peers can influence youngsters' personal norms and behaviors through several routes. For instance, people tend to imitate the behavior of those with whom they are more alike (Bandura, 1997; Cialdini & Goldstein, 2004). Given that peers are more similar in terms of hobbies, age, and lifestyle compared with parents, they may exert a strong influence in the formation of youngsters' personal norms and behaviors. Children may also adjust their personal norms and behaviors to that of their close social group because they want to be accepted in the group (Rubin, Bukowski, & Laursen, 2009) and they may feel social pressure (Fishbein & Ajzen, 2010). They may even develop an environmental identity together (Chawla, 2009). For instance, Duarte, Escario, and Sanagustín (2017) found that not only parental environmental concern but also the average environmental concern of adolescents' school class were positively linked to adolescents' own concern for the environment. Likewise, based on the theory of reasoned action, Gotschi, Vogel, Lindenthal, and Larcher (2010) examined whether adolescents' consumption of organic products was influenced via the social pressure exerted by various significant others, such as parents, siblings, friends, and classmates. According to their results, injunctive norms influence adolescents' behavioral choices regarding buying organic products, with family having a stronger impact than friends.

To the best of our knowledge, no studies to date have examined simultaneously the role that both parents and peers may have in the development of adolescents' personal environmental norms and EB. We do not know whether these social agents contribute independently to the explanation of adolescents' behavior, and how strong each of these is. Extending previous studies (Casaló & Escario, 2016; Grønhøj & Thøgersen, 2012; Matthies et al., 2012), our primary aim is to add to the research in this area by taking a closer look at how adolescents' personal environmental norms and EB are developed in social interaction with parents and peers. In addition, we also consider the possibility of adolescents' biased perception of social norms which can, in turn, affect the research findings (Falk & Zimmermann, 2013).

Misperceptions of Norms

People tend to overestimate or underestimate the behavior and approval of their reference group based on their own behavior and attitudes (Borsari & Carey, 2003; Cialdini et al., 1995), and this biased perception might affect their own behavior. Researchers have attributed this tendency to various causes such as people's preference for consistency (e.g., being consistent avoids cognitive dissonance; Festinger, 1957) and the false consensus effect (Mullen & Hu, 1988). For example, Wenzel (2005) found that taxpayers tend to overestimate others' acceptance of tax evasion. This misperception of the social norm leads taxpayers to adjust their tax compliance. Similarly, adolescents tend to overestimate the use and approval of alcohol of their peers (Borsari & Carey, 2003; Perkins, 2002), and this misperception of social norms can be internalized over time and affect their own attitude toward drinking (Prentice & Miller, 1993).

The need for consistency has also been described in the environmental domain (Thøgersen, 2004) although it has rarely been considered (for exceptions, see Vesely & Klöckner, 2017). When examining the possible social influence of relevant persons on youngsters' environmentalism, researchers have either asked participants about their perceptions of relevant others' environmental attitudes (EA) and behaviors (Cheng & Monroe, 2012; Gotschi et al., 2010) or registered parents' self-reported EA and behaviors (Casaló & Escario, 2016; Grønhøj & Thøgersen, 2012; Matthies et al., 2012). Registering participants' perception of social environmental norms has practical reasons, making it preferable over collecting data directly from key socializers (e.g., it is easier and less time-consuming). However, the preference for consistency and its demonstrated effects on survey response behavior (Falk & Zimmermann, 2013) might lead researchers to inaccurate conclusions. Considering the possibility of misperception in adolescents'

norms, we include two independent databases in our study. The first one includes adolescents' perceptions of significant others' behaviors and the second one significant others' self-reported behaviors.

The Present Study

The present study explores adolescents' norms and behaviors in favor of the environment in relation to parents and peers. We take adolescents' best friend within their school class as a representative of the peer group influence.

Social (injunctive and descriptive) norms in relation to pro-EBs and adolescents' pro-EA are considered as precursors of personal environmental norms and EB. We expect that parents' and best friend's pro-EBs (i.e., descriptive norms) will exert a direct influence on adolescents' EB (Hypothesis 1a [H1a]). This is based on Bandura's (1986) social learning theory, and in concordance with Cialdini's (2001) premise regarding individuals' imitation of significant others' behaviors as a shortcut when choosing how to behave. Because of the social pressure adolescents may feel within their close social group (parents and best friend), we also expect injunctive norms (i.e., the perceived way in which parents and best friends want adolescents to behave) to have a direct effect on adolescents' EB (Hypothesis 1b [H1b]).

In addition, we hypothesize that adolescents' personal norm will have a direct effect on adolescents' EB (Hypothesis 2 [H2]). Furthermore, both injunctive norms and descriptive norms are expected to be partially internalized, leading to personal norms. Thus, we expect injunctive and descriptive norms to have an indirect effect on EB via personal norms (Hypothesis 3 [H3]).

Following the approach of Grønhoj and Thøgersen (2009, 2012) and Stern (2000), a measure of adolescents' EA, the New Ecological Paradigm (NEP) scale (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000) is included in our model. EA have previously been seen as a precursor of EB (Schultz & Kaiser, 2012; Staats, 2003), both directly and indirectly through personal norms (Stern, 2000). Thus, we hypothesize that adolescents' EA will have a direct effect on their EB (Hypothesis 4a [H4a]). Considering that an individual's development of moral judgment is thought to be based on a cognitive understanding of what is right or wrong (Kohlberg, 1984), we also hypothesize that EA will have an indirect effect on EB via personal norms as a mediator (Hypothesis 4b [H4b]).

To examine the possible misperception of social environmental norms, the hypotheses are tested in two independent databases. In the first one, descriptive norms are operationalized as adolescents' perceptions of the significant others' (i.e., dad, mum, and best friend) EB. In the second one, we examined whether the hypothesized relationships hold when significant others report their frequency of conducting EB, and these reports are taken as indicators of

adolescents' descriptive norms. Mums and best friends were included in this second database but not dads. This was done due to the difficulty of having both parents filling in a questionnaire. Mums were chosen because they generally exert a stronger influence on their children's behaviors, than dads do (Lamb, 2000). For example, previous studies have shown that when the parent who felt most responsible for the education of the child is asked to fill in the questionnaire, more than 90% of the questionnaires came from mums (Matthies et al., 2012).

Method

Participants

The first database consisted of 330 adolescents. The second database was formed by 152 adolescents–mum–best friend triads. The initial number of triads in Database 2 was 172 but 20 of them had to be excluded. This was mainly due to a high amount of missing data in the mothers' questionnaires.

Data were collected in two public high schools in Teruel, Spain. In Spain, the standards for knowledge and competencies students acquire in public high schools are set by the Spanish central and local government. The two participating schools are from the same geographical region, thus keeping knowledge and skills acquired about environmental issues in the school as similar as possible. Moreover, Spanish parents cannot choose what public high school their children attend. Children are allocated to a specific high school according to their place of residence. Therefore, to keep participants' socioeconomic status and neighborhood characteristics as similar as possible, the high schools chosen to participate were allocated close to each other.

Adolescents were from 12 to 19 years old (Database 1: $M = 14.55$, $SD = 1.58$; Database 2: $M = 15.83$, $SD = 0.74$). The majority of the participants whose parents' reported their educational status came from well-educated families (above 65% in both databases were college graduates). Most of the respondents who reported their family income came from middle-income families (according to Spanish income standards): between 25,000 and 45,000 Euros net household income per year. Less than 20% came from a low socioeconomic income group and less than 10% from a high one. See Table 1 for more detail on the descriptive data for each database.

Procedure

The principal of each high school was contacted and asked for permission to collect data in the high school. Participants were assured that the information provided was anonymous and were asked for their assent. If an adolescent did

Table 1. Descriptive Data of Participants' Background.

Database	Gender		Age		Parents went to university ^a (%)	Socioeconomic status ^a		
	Boys %	Girls %	M	SD		Low %	Medium %	High %
1	47.6	52.4	14.55	1.58	69.2	19.3	74.28	6.42
2	45.4	54.6	15.83	0.74	66.7	17.9	73.13	8.95

Note. Missing data in percentage of parents who went to university = 24.2% (Database 1) and 32.9% (Database 2); Missing data in socioeconomic status = 57.6% (Database 1) and 55.9% (Database 2).

^aThese percentages are calculated from those who reported their educational/socioeconomic status.

not assent ($n = 8$), he or she stayed in class doing other tasks assigned by his or her teacher. Questionnaires were completed in the classrooms, within the school hours. A trained assistant researcher collected the data with the supervision of the teacher. For Database 1, parents were asked to sign a parental consent form. For Database 2, parents received a parental consent form together with a questionnaire registering their own and their children's frequency of conducting pro-EBs. Mums were asked to fill in this questionnaire. In addition, adolescents were asked to indicate their best friend within the participants in their class.

Measures

All the measurements included are based on a 5-point scale.

Adolescents' questionnaire

Adolescents' EB. This measure was formed by eight items. Participants indicated the frequency of conducting each behavior, from 1 (*never*) to 5 (*always*). The behaviors included were chosen because they can be carried out by adolescents and adults. These are as follows: (a) I separate paper and cardboard from the rest of the waste, (b) I separate glass from the rest of the trash, (c) I separate plastic from the rest of the trash, (d) I make an effort to not waste electricity, (e) I make an effort to not waste water, (f) I remind my friends to collect our trash after a picnic, (g) I participate in initiatives to protect the environment, and (h) I spend time in natural areas. The internal consistency was adequate in both databases (α Database 1 = .75; α Database 2 = .80).

Mum/dad/best friend's descriptive norm. For Database 1, the adolescent was asked about the perception he or she had about the frequency of his or

her mum/dad/best friend conducting the same eight environmental actions described above. For example, “My mum/dad/best friend separates paper and cardboard from the rest of the waste.” The internal consistency was α mum = .80, α dad = .85, and α best friend = .81. For Database 2, adolescents’ responses were matched with those of the best friend (i.e., best friend descriptive norm was operationalized as best friend’s self-reported behavior). The α was .79. Please see *Parental Questionnaire* for parental descriptive norm in Database 2.

Mum/dad/best friend’s injunctive norm. Adolescents were asked whether they thought their mum/dad/best friend wanted them to perform the eight behaviors described above. For instance, “My mum wants me to separate paper and cardboard from the rest of the waste.” The internal consistency in Database 1 was α mum = .86, α dad = .89, and α best friend = .93. The internal consistency in Database 2 was α mum = .85 and α best friend = .89.

Personal norm. Adolescents reported whether they felt morally obliged to conduct the eight behaviors described above. For instance, “Because of my own values/principles, I feel obliged to separate paper and cardboard from the rest of the waste.” The internal consistency in Database 1 was α = .86. The internal consistency in Database 2 was α = .86.

EA. The NEP scale adapted to be used with Spanish children (Corraliza, Collado, & Bethelmy, 2013) was employed. It consists of 11 items (e.g., “Animals and people should be treated equally”). The internal consistency in Database 1 was α = .84. The internal consistency in Database 2 was α = .82.

Parent’s Questionnaire

Mum’s descriptive norm. Mums reported their frequency of conducting the same eight behaviors their children were asked for. The internal consistency was α = .79.

Data Analyses

The main objective of our analytic approach was to explore the direct and indirect effects of social norms and EA on adolescents’ personal norms and EB. This was done through structural equation modeling (SEM) with Mplus. The original, completely a priori model hypothesized that descriptive norms (mum, dad, and best friend), injunctive norms (mum, dad, and best friend), and EA affected personal norm, which in turn affected EB (H2). This proposes that personal norm is a mediator (H3 and H4b). In addition, this

theoretical model predicted that the predictor variables (descriptive norms, injunctive norms, and EA) also directly affected EB (H1a, H1b, and H4a). This model, although theoretically meaningful, is not testable from a statistical point of view. The reason for this is that it does not pass the *t* rule, a necessary but not sufficient condition for model identification: “the number of non-redundant elements in the covariance matrix of the observed variables must be greater than or equal to the number of unknown parameters” (Bollen, 1989, p. 93). Specifically, the a priori model has a total of 54 unknown parameters but only 45 nonredundant elements in the covariance matrix. Due to this lack of identification of the model, a different analytical strategy has been adopted.

First, a much more parsimonious model has been established as the original model. This model tests for the effects of social norms and EA on adolescents’ personal norms while personal norms affect EB (i.e., a complete mediational model). Second, if this model does not fit the data, large and significant modification indices for the direct effects of social norms and EA on EB are used to introduce changes leading to a new model, and this new model is tested until good fit indices are achieved. This methodological approach is also in agreement with the propositions postulated in the theory of planned behavior (Ajzen, 1991), which suggests that all the relationships proposed can be present, but this is not necessarily the case for any data set (Ajzen, 2017). We started with Database 1, which operationalized descriptive norms as adolescents’ perceptions of relevant others’ EB. This conceptual model was then tested with Database 2.¹

The model’s fit to the observed data was assessed using several tests and indices (Hu & Bentler, 1999; Tanaka, 1993) applying the recommended criteria: (a) chi-square statistic (Kline, 1998; Ullman, 1996), (b) the comparative fit index (CFI) > .90, (c) the root mean squared error of approximation (RMSEA) < .08, (d) the Tucker–Lewis index (TLI) > .90 (Tucker & Lewis, 1973), and (e) the standardized root mean squared residuals (SRMR) < .08.

Results

Normative Influence on Personal Norm and EB: Database 1

Adolescents’ percentage of response in each level of EB is presented in Table 2.

As expressed above, we started with a complete mediation model in which all the independent variables have an effect on adolescents’ EB through personal environmental norm. Descriptive statistics and correlations among all the variables in the model are presented in Table 3.

The a priori model (complete mediation) did not show a good fit to the data: $\chi^2_7 = 166.237, p < .001, CFI = .664, TLI = .280, RMSEA = .263 [.229, .298],$

Table 2. Adolescents' Percentage of Response in Each Level for Each Pro-Environmental Behavior in Databases 1 ($N = 330$) and 2 ($N = 152$).

Behavior	Database 1					Database 2				
	1	2	3	4	5	1	2	3	4	5
I separate paper and cardboard from the rest of the waste	13.6	10.6	30.9	25.4	19.5	12.5	12.5	20.4	30.9	23.7
I separate glass from the rest of the trash	10.6	8.1	16.7	15.2	49.4	7.2	15.8	15.1	13.2	48.7
I separate plastic from the rest of the trash	14.5	10.3	25.2	21.5	28.2	14.5	7.9	18.4	37.5	21.7
I make an effort to not waste electricity	5.2	13.1	29.3	27.9	24.5	7.9	21.1	34.2	21.7	15.1
I make an effort to not waste water	3.9	9.4	29.4	29.7	27.6	3.9	23.7	33.6	21.7	17.1
I remind my friends to collect our trash after a picnic	26.7	21.2	27.3	10.3	14.5	24.3	25.7	28.5	7.0	14.5
I participate in initiatives to protect the environment	40.8	26.7	18.5	7.6	6.4	32.9	36.6	22.4	3.9	4.2
I spend time in natural areas	5.5	12.4	39.4	23.3	19.4	3.9	17.8	48.0	21.1	9.2

Note. 1 = never, 2 = almost never, 3 = sometimes, 4 = almost always, 5 = always.

SRMR = .091. Given these results, a second model was estimated according to modification indices. This new model explains 66% of adolescents' EB variance and 50.5% of their personal environmental norm, and it fits the data well: $\chi^2_6 = 6.360$, $p = .384$, CFI = .999, TLI = .998, RMSEA = .013 [.000, .074], SRMR = .008 (see Figure 1). Adolescents' EB is predicted by their personal environmental norm (H2) and their EA (H4a). Descriptive norms (DN) have a direct effect on adolescents' EB (H1a), with mum having the strongest effect ($\beta_{DN\ mum} = .270$; $\beta_{DN\ dad} = .165$; $\beta_{DN\ best\ friend} = .193$, all $p < .01$). Moreover, mum's descriptive norms also have a direct effect on adolescents' personal norm (H3). In addition, mum's and best friend's injunctive norms predict adolescents' personal norm ($\beta = .333$ and $\beta = .284$, respectively; H3) but have no direct effect on adolescents' EB (H1b). Dad's injunctive norm did not have any effect on adolescents' personal environmental norm (H3), nor on their EB (H1b).

According to the results obtained with Database 1, parents and friends seem to have a direct and an indirect effect on adolescents' EB. This is in agreement with previous research with adults in which the perceptions of social norms have been used as precursors of behaviors (Bamberg et al., 2007; Harland,

Table 3. Descriptive Statistics and Correlations Among All the Variables in the Model in Database I.

	M	SD	Asymmetry	Kurtosis	Descriptive			Descriptive			Injunctive				
					norm mum	norm dad	norm best friend	norm mum	norm dad	norm best friend	norm mum	norm dad	norm best friend		
Descriptive norm mum	3.76	0.77	-0.70	0.40	I										
Descriptive norm dad	3.57	0.91	-0.69	0.26	.67**	I									
Descriptive norm best friend	3.20	0.91	-0.09	0.46	.51**	.49**	I								
Injunctive norm mum	4.06	0.78	-1.16	1.90	.75**	.56**	.46**	I							
Injunctive norm dad	3.88	0.89	-0.94	0.83	.59**	.65**	.39**	.75**	I						
Injunctive norm best friend	3.36	1.04	-0.61	-0.07	.40**	.37**	.59**	.50**	.45**	I					
Adolescents' environmental attitudes	3.63	0.54	-0.39	1.18	.34**	.28**	.25**	.39**	.31**	.18**	I				

**p < .01.

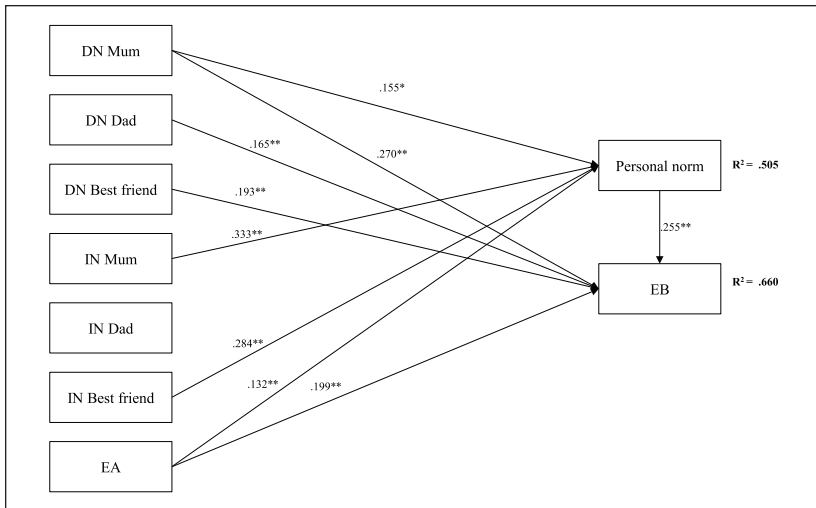


Figure 1. Normative influence in adolescents’ personal environmental norm and EB in Database 1.

Note. Correlations are not shown for the sake of clarity (see Table 3). EB = environmental behavior; DN = descriptive norm; IN = injunctive norm; EA = environmental attitudes.

* $p < .05$. ** $p < .01$.

Staats, & Wilke, 2007). As described above, this approach excludes the possibility of participants’ misperceptions of social norms or adjustment of their responses as to appear more consistent (Falk & Zimmermann, 2013). To investigate the possible perception bias of relevant others’ social norms, we explored whether the conceptual model used with Database 1 could be replicated in Database 2. Two changes were made in this second model: (a) Descriptive norms were registered as relevant other’s self-reported behavior, and (b) due to the difficulty of obtaining responses from both mums and dad, and taking into account that mums generally have the stronger influence in their adolescents’ environmentalisms, only mums were included in the analysis.

Normative Influence on Norm and EB: Database 2

As specified in the “Data Analyses” section, we departed from a total mediation model. Descriptive statistics and correlations among all the variables in the model are presented in Table 4.

This initial (complete mediation) model did not fit the data reasonably well: $\chi^2_5 = 27.119$, $p < .001$, CFI = .892, TLI = .762, SRMR = .057, and

Table 4. Descriptive Statistics and Correlations Among All the Variables in the Model in Database 2.

	M	SD	Asymmetry	Kurtosis	Injunctive norm mum	Descriptive norm mum	Injunctive norm best friend	Descriptive norm best friend
Injunctive norm mum	4.24	0.60	-.83	0.21	I			
Descriptive norm mum	4.06	0.61	-.32	-0.87	.49**	I		
Injunctive norm best friend	3.49	0.75	-.68	1.86	.24**	.29**	I	
Descriptive norm best friend	3.23	0.64	-.42	0.53	.47**	.45**	.31**	I
Adolescents' environmental attitudes	3.82	0.48	.23	-0.65	.55**	.18*	-.10	.23**

* $p < .05$. ** $p < .01$.

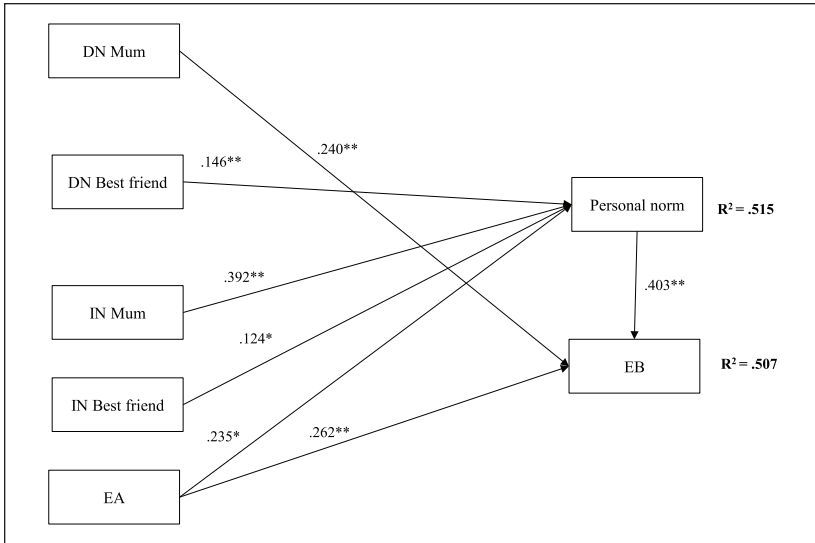


Figure 2. Results of the model test for Database 2.

Note. For the sake of clarity, correlations are not shown (see Table 4). DN = descriptive norm; IN = injunctive norm; EA = environmental attitudes; EB = environmental behavior. * $p < .05$. ** $p < .01$.

RMSEA = .171 [.111, .236]. Given these results, a second model was estimated according to modification indices. This model explains 50.7% of adolescents' EB variance and 51.5% of their personal environmental norm, and it fits the data well: $\chi^2_2 = 3.243$, $p < .197$, CFI = .994, TLI = .967, SRMR = .017, and RMSEA = .064 [.000, .186].

As can be seen in Figure 2, adolescents' EB was predicted by their personal norm ($\beta = .40$; H2), their EA ($\beta = .26$; H4a), and mum's descriptive norms ($\beta = .24$; H1a). In addition, best friend's descriptive and injunctive norms, mum's injunctive norm, and adolescents' EA have an indirect effect on adolescents' EB through personal norms (H3 and H4b). Similar to the results obtained with Database 1, mums appear to have a stronger effect on adolescents' personal norms and behaviors than best friends.

Discussion

There is broad evidence supporting the power of social norms in the regulation of people's behavior. However, the evaluation of how both personal norms and behaviors in favor of the environment are developed in young

populations through social interaction has been scant (but see Matthies et al., 2012). Furthermore, when significant others have been considered, attention has mainly been paid to parents (Grønhøj & Thøgersen, 2009, 2012; Meeusen, 2014), leaving out the possible effect that other key socializers may have in shaping youngsters' environmentalism. To fill this gap in the literature, we presented a study with two main contributions: First, we evaluated how the normative pressure exerted by parents and peers affects adolescents' personal environmental norms and self-reported EB; second, we examine this normative influence in two independent databases that allowed us to replicate our findings with a different measure.

Comparison With Earlier Research and Main Contribution of the Study

Overall, our results are in line with previous studies with adults (Bamberg et al., 2007; Bratt, 1999; Harland et al., 1999) and younger children (Matthies et al., 2012) on the effect of personal and social norms on pro-environmental actions. According to our findings, descriptive and injunctive norms have both a direct effect on adolescents' self-reported pro-EBs (e.g., Göckeritz et al., 2010; Grønhøj & Thøgersen, 2012) and an indirect effect, via a personal sense of obligation to behave in a certain way (i.e., personal norms; Bamberg et al., 2007; Bratt, 1999; Matthies et al., 2012). In line with previous research (e.g., Bamberg et al., 2007; Matthies et al., 2012) as well as with propositions postulated in action models such as the theory of planned behavior (Ajzen, 2017; Fishbein & Ajzen, 2010), this was not the case for each specific path in each database. For example, we found that mum's descriptive norms (operationalized either as perceived or self-reported behavior) had a direct effect on adolescents' EB. This was also the case for adolescents' perceived dad's and best friend's behavior (descriptive norms; Database 1) but not for the best friend's self-reported behavior (descriptive norms; Database 2), partially supporting H1a. In addition, mum's, dad's, and best friend's EB as perceived by the participants (descriptive norms; Database 1) and best friend's self-reported EB (descriptive norm; Database 2) had an indirect effect on adolescents' EB, confirming H3. Also in line with H3, we found that adolescents' perceptions of significant others' approval or disapproval of pro-EBs (i.e., injunctive norms) had an indirect effect on EB via personal norms, with the exception of dad's injunctive norm. However, contrary to H1b but in line with previous studies with adults (e.g., Bamberg et al., 2007; Bratt, 1999), injunctive norms only affected adolescents' EB indirectly, via personal norms. As expected, personal norms were directly associated with adolescents' EB, supporting H2.

To the best of our knowledge, this is the first time that the influence of both parents and peers is considered together in the development of adolescents' personal environmental norms and self-reported pro-EB. Our findings show that parents and best friends seem to be key socializers that help develop a sense of moral obligation to protect the environment (i.e., personal norm) and that also have an additional direct influence on adolescents' EB. As suggested by Matthies et al. (2012), mums appear to have a stronger role in adolescents' environmentalism than do dads. This might be due to the fact that mums are usually more involved in their children's education than are dads (Lamb, 2000). This is also the case for Spanish families (Maganto, Bartau, & Etxeberria, 2004). Furthermore, we found that best friends play a significant role in children's environmentalism. These results align with the findings obtained in different behavioral domains such as eating and physical activity (Baker, Little, & Brownell, 2003), substance abuse (Musick, Seltzer, & Schwartz, 2007), and risk behavior (Gardner & Steinberg, 2005). In consonance with Gotschi et al. (2010), family normative pressure seems to be slightly stronger than that of friends. One reason for this may be that primary agents of socialization (mainly parents) set up the basic norms and behavioral patterns that endure through adolescence (Maccoby, 2007). Secondary social agents, such as friends, moderate the early norms and action patterns shaped by parents, but their effect tends to be weaker than the one set up by primary social agents in early stages of life (Arnett, 2004). It would be interesting to study whether the strength of these relationships varies when behaviors are shaped later in life.

Also in line with previous studies with adults (Bamberg & Möser, 2007; Stern, 2000) and younger populations (Cheng & Monroe, 2012; Grønhøj & Thøgersen, 2012; Wells & Lekies, 2006), participants' EA are positively linked to their EB. These associations are both direct and indirect, via personal norms, supporting Hypotheses 4a and 4b. In accordance with developmental theories (Kohlberg, 1984; Piaget, 1965) as well as with studies examining children's environmental moral development (Hussar & Horvath, 2011; Kahn, 1997; Kahn & Lourenco, 2002), it appears that a cognitive understanding of what is right or wrong in relation to the environment helps develop a feeling of moral obligation to protect it.

Less common are the findings concerning the possibility of misperceiving social environmental norms. Given people's preference for consistency, participants can overestimate or underestimate key socializers' behaviors to align them to their own attitudes and behavior (Borsari & Carey, 2003). This could lead to inflated (and therefore inaccurate) associations in research results. Researchers have warned about the consistency bias effect when using surveys (Falk & Zimmermann, 2013), and

environmental psychologists have also called for caution on this matter (Vesely & Klöckner, 2017). Following this rationale, we included two databases in our study, allowing us to explore whether adolescents tend to look for consistency in their answers. The good news is that results found in both databases are quite similar in terms of directions and strength of the effects. The results obtained with perceived significant others' behavior as independent variables were replicated with a sample in which personal norms and EB were predicted by the similar behaviors performed, and reported by their mother and their best friend. This indicates that, contrary to previous studies using surveys (Falk & Zimmermann, 2013), adolescents' responses do not seem to be biased to achieve consistency in their responses, and report their parents and peers behaviors quite accurately. This gives stronger support for the premise that parents and best friends help develop a feeling of moral obligation to protect the environment as well as to perform pro-environmental actions. These findings also give additional validity to previous studies in which only perceived social norms were included (e.g., Bamberg et al., 2007; Göckeritz et al., 2010; Harland et al., 2007).

Limitations and Future Research

Overall, the results of this exploratory study highlight the importance of social interaction for the development of personal environmental norms and behaviors. Nevertheless, there are several limitations that should be considered. First, we do not know the mechanisms underlying the associations found between social and personal norms and EB. For instance, it may be that adolescents copy the behavior of those they consider more expert in such behavior because they serve as a guide for the correct course of action in a specific cultural context (Bandura, 1986), allowing the adolescent to save cognitive resources (Cialdini et al., 1990). According to Rogoff, Paradise, Arauz, Correa-Chavez, and Angelillo (2003), this behavior imitation can lead to an intrinsic motivation to perform such behavior. Furthermore, it seems likely that peers and parents affect adolescents' environmentalism through different pathways. For example, adolescents' norm compliance with their parents might be an attempt to avoid sanctions (Matthies et al., 2012). On the contrary, normative influence exerted by peers may rely on a wish to avoid social exclusion. These speculations deserve further systematic evaluation. Given that there is ample evidence on the effect of social influence on pro-EB, especially with adults, future studies should also examine the processes underlying these associations. This would involve considering possible mediating and moderating variables, especially in young populations. For instance, researchers could

consider parental communication modes (Meeusen, 2014), as they seem to moderate the transmission of environmental concern from parents to children. To provide a better understanding of the socialization processes of youngsters' environmentalism, future studies should examine different psychological constructs and pathways that affect the power of social influence on environmentalism. Such constructs include, but are not limited to, personal involvement in conservation action (Göckeritz et al., 2010), feelings of guilt (Bamberg et al., 2007), self-efficacy and response efficacy (Staats, Jansen, & Thøgersen, 2011), and global social norms (Vesely & Klöckner, 2017).

Second, our data are cross-sectional. Thus, our conclusions are based on theoretical considerations, and causal conclusions cannot be made. Our findings align with that of previous studies (Bamberg et al., 2007; Casaló & Escario, 2016; Duarte et al., 2017; Grønhøj & Thøgersen, 2012; Matthies et al., 2012), but to establish causality with respect to the directionality of the effects, future experimental and longitudinal studies are needed. Most of the evidence gathered until now about the influence of parents on children's behaviors in the environmental domain suggests that this influence goes from parents to children, and that the reverse effect is quite weak (Casaló & Escario, 2016; Gotschi et al., 2010; Grønhøj & Thøgersen, 2009). However, the results of the present study and preceding ones cannot rule out the possibility of a bidirectional influence between parents and adolescents as well as between best friends and adolescents. This is especially important considering that adolescents often receive environmental education at school. For instance, Grodzinska-Jurczark, Bartosiewicz, and Twardowska (2003) found that early teenagers who attended an environmental education program about waste had frequent discussions with their parents about what they had learnt there. In turn, these discussions regulated the family waste practices. Similar to previous studies (Duarte et al., 2017; Gotschi et al., 2010), we cannot tease the direction of the influence of best friends from our data either. It may be plausible that the correlations found are an effect of the social context (Bamberg et al., 2007). For example, participants may find the same difficulties at home, at school, or in other social contexts to conduct pro-environmental actions as their parents and best friends. It may also be that adolescents, parents, and their peers are influenced by the most distal, overarching, cultural belief system which might, in turn, have an effect on their norms on a more immediate level (Vesely & Klöckner, 2017). Our study offers a first exploration of the development of personal environmental norms and behaviors considering not only parents but also peers. Qualitative studies that take a holistic approach (De Mol & Buysse, 2008) combined with experimental and longitudinal procedures will help us disentangle these possible reciprocal effects.

Third, social agents in our study are represented by individuals, and the social pressure exerted by surrounding social groups has not been taken into consideration. For instance, adolescents' environmentalism may be influenced by their peer group's environmentalism both within their class (Duarte et al., 2017; Gotschi et al., 2010) and outside the school environment (e.g., sport clubs, neighborhood friends). Importantly, other social agents not included in the most immediate circle are likely to influence adolescents' environmentalism. For example, globally shared normative judgments may shape the social norms of adolescents' closest persons (Vesely & Klöckner, 2017). These global norms are likely to be shaped by social media and information and communication technologies. Thus, researchers could take a closer look at, for instance, how the ubiquitous presence of messages in relation to environmental problems in several social media affects the development of children's and adolescents' environmentalism. Would adolescents consider that behaving in a pro-environmental way is the accepted social global norm or would these messages generate a feeling of learned helplessness against global environmental issues? How is the influence of these global socialization forces translated into family and peers' normative pressure and into specific pro-environmental actions? The socialization of environmentalism in a globalized world open up new (and needed) opportunities for research. It is also worth considering that it might be more difficult to obtain an accurate grasp of some key socializers' behavioral pattern (e.g., the school social norm) or global social norms (Vesely & Klöckner, 2017) and the way these work out in specific situations (Aarts & Dijksterhuis, 2003). In these cases, the need to use methodological approaches that account for response bias becomes stronger.

Practical Implications

Our findings open up new lines for environmental education interventions. For instance, most environmental education programs are targeted at children (Rickinson, 2001; Zint, 2012). Acknowledging the importance of these, practitioners could also design environmental educational programs aimed at increasing parental pro-environmentalism as this is likely to have a positive influence not only on parents but also on their children. This is especially important given that parental behaviors, both as perceived and self-reported, are positively associated with their children's environmentalism. Furthermore, attention should be paid to collective action in favor of the environment. Youngsters can become overwhelmed by the difficulty of solving distant and complex environmental problems individually (Chawla, 2009; Sobel, 2008). Thus, it may be interesting to provide guidance to tackle environmental

problems collectively. For example, previous researchers have shown that school socialization is also an important agent contributing to children's environmentalism (Casaló & Escario, 2016; Duarte et al., 2017). Adolescents in a certain school could be shown, for instance, how similar others in a different school have enrolled in collective pro-environmental actions, such as an energy-saving plan or a school waste reduction project. Designing intervention strategies that consider the power of normative influence in the development of youngsters' environmentalism is a fruitful line for future work.

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Note

1. The model checked in Database 2 is a conceptual replication of the one checked in Database 1. These are not identical models as different indicators (mum's and best friend's self-reported environmental behavior [EB] instead of perceived EB) are used in Database 2.

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